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Excessive Foot Mobility Enhances Static Stability under Visual Perturbation

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PURPOSE: Lack of balance and postural stability has been linked to an increase in injury prevalence. Variations of postural sway have been associated with increased prevalence of ankle injury in basketball players and increased sway index in female soccer players, where balancing on a soft surface has been linked with injury and suggests that impaired proprioception may be a prominent influence on balance deficit. Center of pressure (COP) displacement has been found to be a factor in ankle instability during the early stage of weight acceptance during lateral movement, which may result in a reduction in capacity to dissipate ground forces upon impact. COP control is particularly challenged when the visual field is distorted. Static instability may be associated with lower extremity injury and foot mobility may be associated with instability, especially under perturbation. Therefore, the purposes of this study were to examine the influence of foot mobility differences on Shear Force Range and Sway Path Linear Mean and to establish a correlation between the two measures in estimating postural instability. **METHODS**: We tested 58 college age subjects using a cross-sectional design and found only low correlations between SFR and SPLM in either eyes open ($r = -0.09$) or visual distortion ($r = 0.21$) conditions on Pearson r statistics. **RESULTS**: Independent t-tests revealed that a mobile foot group showed significantly lower SPLM ($t = 2.05$, $p = .048$), compared to a less mobile (rigid) foot mobility type. Between group differences on SPLM in GOG condition emerged, where higher foot mobility was associated with greater stability. However, SFR was not statistically different between mobility levels. **CONCLUSIONS**: Since group differences occurred only in the visually perturbed condition, we infer that foot mobility appears to affect static stability when appreciation of visual field is diminished and subjects are left to rely on other substrates for postural control.